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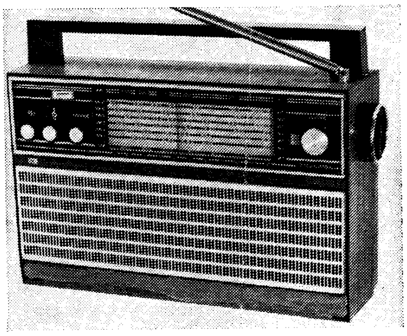
Trader
SERVICE SHEET

3171

Astrad B205
Multiband AM/FM Receiver



(also covering Astrad "Mikado")

A battery-operated portable multiband AM/FM receiver, the Astrad B205 covers long and medium broadcast bands and the 17 to 50 metre short wave bands in 5 ranges on AM, and the VHF broadcast band on FM. Coils for each AM band are mounted on a turret, which is rotated by a band selection control ganged to an indicator alongside the rotary tuning control. A combined battery condition indicator and S-meter is fitted. Independent bass and treble controls augment the volume on/off switch. Reception for long and medium wavebands is from an internal ferrite aerial; that for short wave and VHF from an external telescopic aerial.

Additional facilities include a 5-pin DIN socket for connection to a tape recorder or external amplifier, twin earphone/extension speaker sockets, and sockets for external aerial and earth. These sockets are mounted in a panel normally covered by a sliding door in the cabinet back.

Unit construction is used; the units comprise separate AM and FM tuning stages, the common IF panel, and an AF and output panel. The complete receiver is housed in a teak-finish wood-surround cabinet, with black front and rear panels relieved with silver trim. A fixed carrying handle is fitted.

Brief Specification

Power supply	Six HP2 (or equivalent) 1·5V batteries (9V d.c.)			
Wavebands	AM: LW	735·3 to 2000m	(150 to 408kHz)	
	MW	186·9 to 571·4m	(525 to 1605kHz)	
	SW1	16·75 to 16·95m	(17·7 to 17·9MHz)	
	SW2	19·4 to 19·85m	(15·1 to 15·45MHz)	
	SW3	25·0 to 25·6m	(11·7 to 11·97MHz)	
	SW4	30·7 to 31·6m	(9·5 to 9·77MHz)	
	SW5	41·0 to 50·4m	(5·95 to 7·3MHz)	
	FM: VHF	87·5 to 108MHz		
Intermediate frequencies	AM: 465kHz FM: 10·7MHz			
Transistors	AC126 (six), AC127 (two), AD136 (two), AF114 (five), AF178 (two).			
Diodes	BY161, OA90 (eight), T26G (two) (above are nearest U.K. equivalents)			
Audio output	700mW maximum			
Inputs	External aerial and earth } via sockets 9V d.c. } via sockets			
Outputs	Tape recorder (via 5-pin DIN socket) External loudspeaker or earphone (via jack)			
Loudspeaker	5×3in (126×75mm) elliptical, impedance 8 ohms			
Dimensions	*Height*	*Width*	*Depth*	
	10in	13⅞in	4½in	
	(261mm)	(352mm)	(116mm)	
Weight	8 lb 12oz (3·9kg) without batteries			
Manufacturer	V/O Radiozagranpostavka, Riga, USSR			
U.K. Distribution and Service	Technical and Optical Equipment Ltd., Zenith House, Thane Villas, London N7 01-263 0951			

Dismantling

(see interior view diagram)

1. Remove battery compartment cover and batteries.
2. Remove two screws entering lugs A from back cover – remove back cover.
3. Remove chassis complete as follows:
   (a) Pull off volume, bass and treble control knobs.
   (b) Slacken grub screw G, pull off turret wavechange knob.
   (c) Remove four screws (with washers) B. Carefully ease out chassis. Slacken screw C and disconnect coaxial telescopic aerial lead. (Also note bonding wire from lower r.h. screw B to loudspeaker).
   (d) To remove chassis totally from cabinet, disconnect loudspeaker leads.
4. *Turret tuner coil strips* can be quickly removed by *slackening* screw E, pushing strip to right until it is free of the screw, then disengaging the r.h. end of the strip from the turret chassis slot. DO NOT ATTEMPT TO DIS-ASSEMBLE TURRET MECHANISM.
5. *To remove i.f. board* – release retaining screws, disengage AM/FM changeover switch from turret mechanism, ease out board to extent of wiring.
6. *To remove a.f. and output board* – release support brackets from main chassis after removing screws.
7. *Access to FM tuner* (for alignment or inspection only – it is not recommended that components be changed) is by removing screw F and easing off tuner bottom cover.
8. *Telescopic aerial* slacken clamp screw C, withdraw wishbone type spring clip at cabinet top underside, pull aerial out complete with support sleeve. (Note engagement with mounting slot in cabinet bottom on re-assembly.)

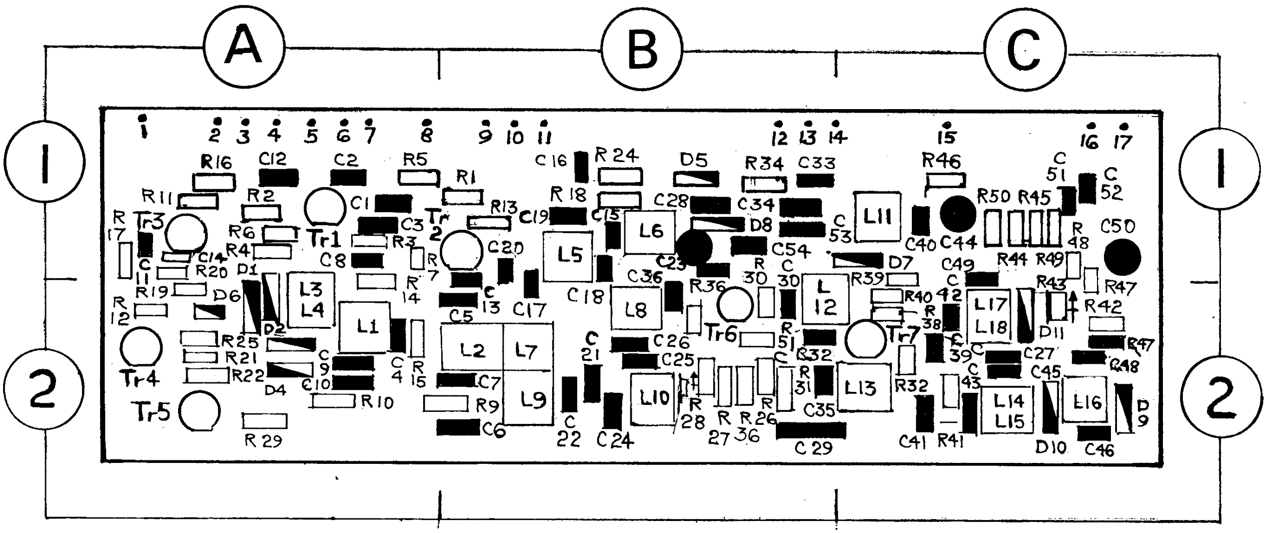
Re-assembly notes

(a) When refitting chassis into cabinet, temporarily fit batteries and check that dial lamp switch contacts operate to light lamp when button by tone and volume controls is pressed.

(b) If difficulty is experienced in re-locating the chassis screw B in the lower l.h. corner, temporarily remove the battery compartment by removing three small screws within the compartment. (This is the screw which also secures the loudspeaker earth bonding lead.)

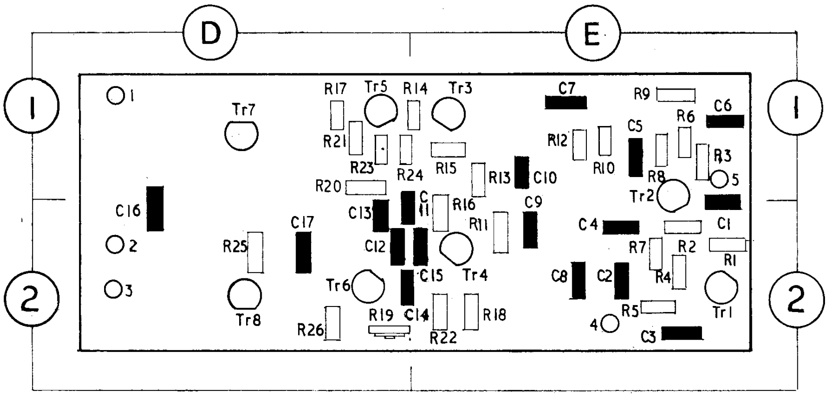
AF output adjustment

Inject 1000Hz tone via volume control to input of AF and output stage, at 30mV level. Connect VTVM across extension loudspeaker hack, and connect an oscilloscope across the loudspeaker terminals. Adjust preset **R19** for 2·0V meter reading consistent with best sinusoidal display.

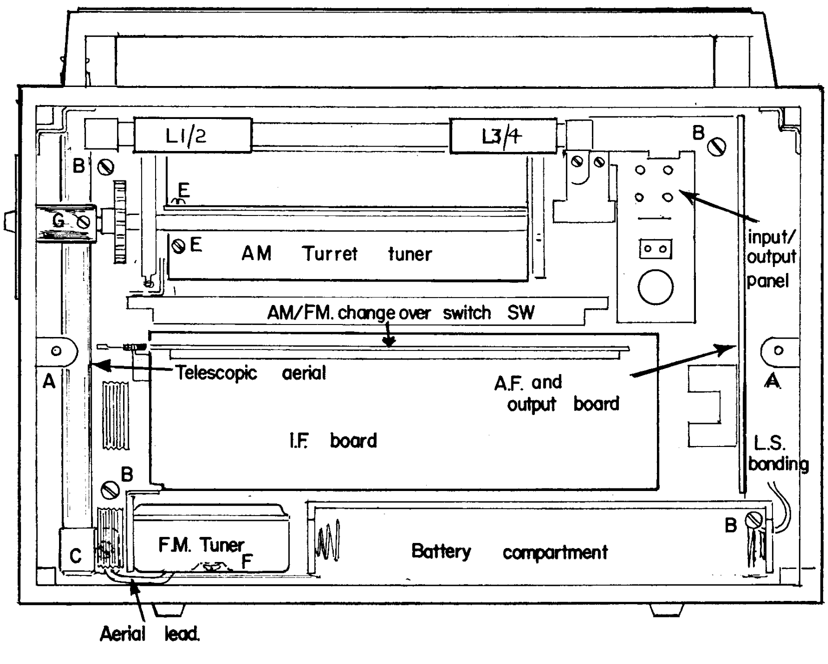


IF unit board ▲

▼ AF and output board



Interior view ▼



Alignment

(see FM tuner, i.f. board and turret strip layout diagrams for locations of coils and trimmers, etc.)

Equipment required

1. AM signal generator covering 100kHz to 20MHz, modulation 1000Hz at 30 per cent.
2. FM signal generator covering 10·7MHz, 80 to 120MHz, deviation 15 to 75kHz, with 30 per cent AM.
3. Electronic multimeter (VTVM).
4. Input matching components as detailed in text.

I.F. Stages

Preliminaries

Set volume control to maximum, and tone controls to mid-point. Connect VTVM across earphone/loudspeaker jack.

All component references are to positions on I.F. board unless otherwise stated.

AM

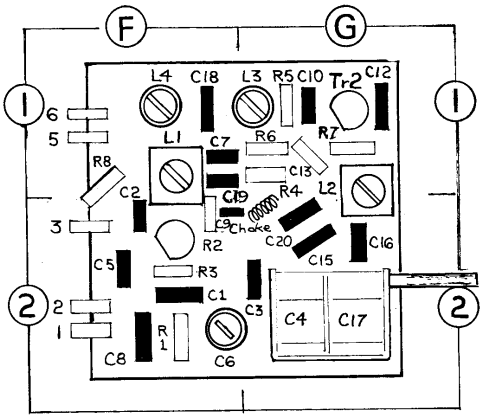
Select MW

1. Connect AM generator, tuned to 465kHz, modulated 1000Hz, level 2 to 3mV, via 0·01 µF capacitor to **Tr7** base. Adjust **L17/L18** for maximum.
2. Transfer generator output, level 80 to 120µV, to **Tr6** base. Adjust **L11** for maximum.
3. Transfer generator output, level 3 to 6µV, to **Tr2** base. Adjust **L10, L9, L7** and **L5** (in that order) for maximum.
4. Transfer generator output, level 80 to 120µV, to input contact **21** on I.F. board (mixer input). Adjust **L3** for maximum.

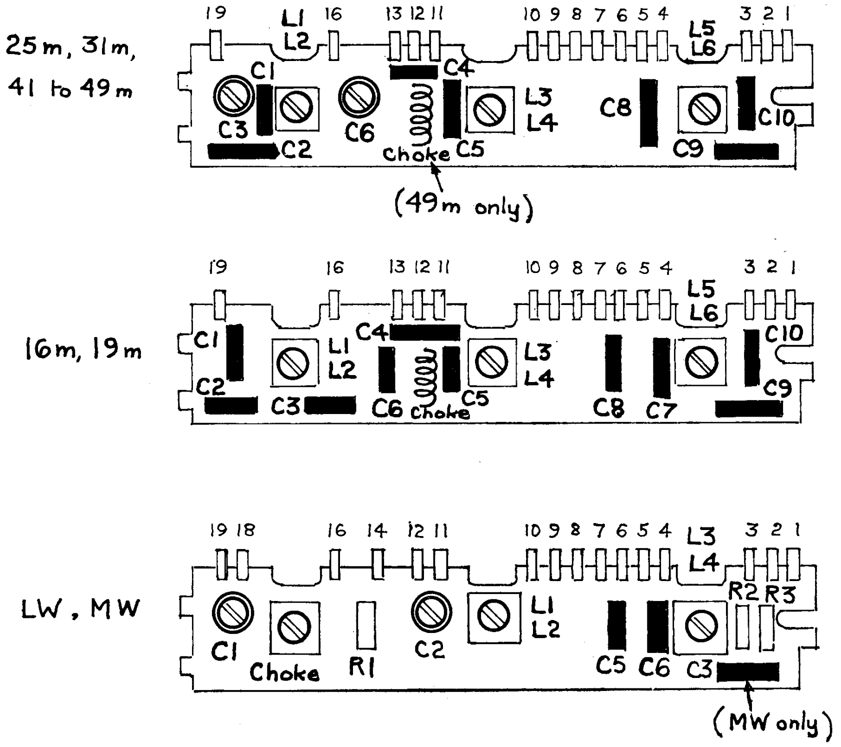
FM

Select "FM"

1. Inject unmodulated 10·7MHz signal from FM generator, level 20 to 30mV, via 0·01 µF capacitor to **Tr7** base. Adjust **L14, L16** for maximum (0·8 to 1·0V).
2. Switch in 30 per cent AM. Adjust **L15** for minimum AM content in output.
3. Transfer generator output, deviated 15kHz, level 1 to 2mV, via 0·01 µF capacitor to **Tr6** base. Adjust **L2, L3** for maximum (0·6V).



▲ FM Tuner board



▲ Turret tuner coil strips

AM TURRET TUNER

Each segment has its resistors and capacitors numbered from "1"; segments for the high frequency (short wave) bands are similar, and components are tabulated below. Segments for the MW and LW bands are similar, and are tabulated at the bottom of the table.

SHORTWAVE

Band	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**	**C10**
16m	150pF	30pF	62pF	150pF	30pF	56pF	43pF	30pF	150pF	150pF
19m	130pF	43pF	62pF	150pF	43pF	56pF	43pF	43pF	150pF	150pF
25m	240pF	68pF	—	240pF	68pF	—	—	68pF	110pF	240pF
31m	240pF	82pF	—	240pF	82pF	—	—	82pF	180pF	240pF
49m	68pF	150pF	4-15pF*	100pF	160pF	8130pF*	—	160pF	150pF	—

MEDIUM AND LONG BANDS

Band	**R1**	**R2**	**R3**	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**
MW	—	180Ω	47Ω	4-15pF*	8-30pF*	8-30pF*	15pF	470pF	—
LW	150kΩ	270Ω	82Ω	4-15pF*	8-30pF*	—	—	82pF	220pF

(See turret wafer layout diagrams for component locations)

*Variable

4. Transfer generator output, level 200 to 400μV, to **Tr2** base. Adjust **L6, L8** for maximum (0·6V).
5. Transfer generator output, level 30 to 70μV, to **Tr1** base. Adjust **L1, L2** for maximum (0·6V).
6. Transfer generator output, level 200 to 400μV, to VHF tuner **Tr2** emitter via a 300pF capacitor. Adjust tuner coils **L3, L4** for maximum (0·6V).

R.F. Stages

AM

Medium and long wavebands

LW (select "LW")

Inject signals via inductive loop to ferrite rod aerial. Component references refer to turret tuner strip layout diagrams. Connect VTVM across loudspeaker.

1. Tune AM signal generator and receiver to 150kHz. Tune **L3, L4,** then **L1, L2** for maximum.
2. Retune generator and receiver to 408kHz. Adjust **C1** for maximum.
3. Retune generator and receiver to 150kHz; adjust *aerial* coils **L3/L4** (by sliding along ferrite rod) for maximum.
4. Retune generator and receiver to 408kHz, if necessary slightly readjust **C1**.
5. Repeat steps 1 to 4 for optimum results.

MW (select "MW")

6. Tune signal generator and receiver to 525kHz. Adjust **L3/L4** for maximum, then **L1/L2.**
7. Retune signal generator and receiver to 1605kHz. Adjust **C3, C2** and **C1** for maximum.
8. Tune generator and receiver to 525kHz; adjust *ferrite aerial* coils **L1/L2** for maximum.
9. Retune generator and receiver to 1605kHz; if necessary slightly readjust **C1**.
10. Repeat steps 6 to 9 for optimum results.

Short wavebands

Inject signals via dummy load and 6·5pF capacitor to base of telescopic aerial.

SW1 (select "SW1")

1. Tune signal generator and receiver to 17·7MHz; adjust **L5, L6** for maximum.
2. Retune generator and receiver to 17·8MHz; adjust **L4, L3, L2** and **L1** for maximum. (Input level 50μV.)

SW2 (select "SW2")

1. Tune generator and receiver to 15·1MHz; adjust **L5, L6** for maximum.
2. Retune generator and receiver to 15·4MHz; adjust **L4, L3, L2** and **L1** for maximum (input level 50μV).

SW3 (select "SW3")

1. Tune generator and receiver to 11·7MHz; adjust **L5, L6** for maximum.
2. Retune generator and receiver to 11·9MHz; adjust **L4, L3, L2** and **L1** for maximum (input level 50μV).

SW4 (select "SW4")

1. Tune generator and receiver to 9·5MHz; adjust **L5, L6** for maximum.
2. Retune generator and receiver to 9·7MHz; adjust **L4, L3, L2** and **L1** for maximum (input level 50μV).

SW5 (select "SW5")

1. Tune generator and receiver to 5·95MHz; adjust **L5, L6** for maximum.
2. Retune generator and receiver to 5·8MHz; adjust **L4, L3** and **C3** for maximum.
3. Retune generator and receiver to 5·95MHz; adjust **L2** and **L1** for maximum.

FM (select "FM")

Inject VHF signals from FM generator, deviated ±22·5kHz, to telescopic aerial input.

1. Tune generator and receiver to 88MHz. Adjust oscillator coil **L3** for maximum.
2. Retune generator and receiver to 108MHz. Adjust coil **L4** for maximum.
3. Repeat steps 1 and 2 for optimum results.

(continued overleaf)

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Alignment *(continued)*

4. Tune generator and receiver to 90MHz. Adjust aerial coil **L2** for maximum.
5. Retune generator and receiver to 100MHz. Adjust coil **L1** for maximum.
6. Repeat steps 4 and 5 for optimum results.

When correctly aligned, output level of signal generator should not exceed 30 to 50µV.

Components

IF UNIT

Resistors

R1	82Ω	B1
R2	2·7kΩ	A1
R3	1·2kΩ	A1
R4	27kΩ	A1
R5	180Ω	A1
R6	4·7kΩ	A1
R7	3·3kΩ	A1
R9	1·2kΩ	B2
R10	27kΩ	A2
R11	390Ω	A1
R12	560Ω	A2
R13	180Ω	B1
R14	1·2kΩ	A2
R15	470Ω	A2
R16	270Ω	A1
R17	100Ω	A1
R18	330Ω	B1
R19	5·6kΩ	A2
R20	3·3kΩ	A1
R21	1kΩ	A2
R22	2kΩ	A2
R24	4·7kΩ	B1
R25	2·4kΩ	A2
R26	3·3kΩ	B2
R27	1·2kΩ	B2
R28	150kΩ	B2
R29	56kΩ	A2
R30	680Ω	B2
R31	1·2kΩ	B2
R32	12kΩ	B2
R34	1kΩ	B1
R36	8·2kΩ	B2
R37	3·3kΩ	C2
R38	2·7kΩ	C2
R39	2·7kΩ	C1
R40	620Ω	C2
R41	180Ω	C2
R42	4·7kΩ	C2
R43	820Ω	C2
R44	5·6kΩ	C1
R45	6·8kΩ	C1
R46	100Ω	C1
R47	6·8kΩ	C2
R48	6·8kΩ	C1
R49	1·8kΩ	C1
R50	6·8kΩ	C1

R568 not quoted in wiring

Capacitors

C1	0·01µF	A1
C2	0·033µF	A1
C3	0·033µF	A1
C4	36pF	A2
C5	39pF	B2
C6	0·033µF	B2
C7	36pF	B2
C8	0·033µF	A1
C9	680pF	A2
C10	680pF	A2
C11	0·015µF	A1
C12	0·033µF	A1
C13	0·033µF	B2
C14	0·033µF	A1
C15	36pF	B1
C16	510pF	B1
C17	6·2pF	B2
C18	0·033µF	B1
C19	39pF	B2
C20	510pF	B1
C21	4·7pF	B2
C22	510pF	B2
C23	36pF	B1
C24	6·2pF	B2
C25	510pF	B2
C26	0·01µF	B2
C27	0·033µF	C2
C28	0·015µF	B2
C29	10µF	B2
C30	36pF	B2
C31	0·015µF	B1
C32	39pF	B2
C33	680pF	B1
C34	6800pF	B2
C35	36pF	B2
C36	0·033µF	B1
C38	20µF	B1
C39	0·033µF	C2
C40	0·033µF	C1
C41	180pF	C2
C42	1000pF	C2
C43	100pF	C2
C44	50µF	C1
C45	30pF	C2
C46	62pF	C2
C47	270pF	C2
C48	270pF	C2
C49	3300pF	C1
C50	10µF	C1
C51	0·015µF	C1
C52	2200pF	C1

Transistors

Tr1	AF114	A1
Tr2	AF178	B1
Tr3	AF178	A1
Tr4	AC126	A2
Tr5	AC127	A2
Tr6	AF114	B2
Tr7	AF114	C2

(types quoted are nearest UK equivalents)

Diodes

D1-D4	OA90	A2
D5	OA90	B1
D6	OA90	A2
D7	BY161	C1
D8	OA90	B1
D9	T26G	C2
D10	T26G	C2
D11	OA90	C2

(types quoted are nearest UK equivalents)

A.F. AMPLIFIER

Resistors

R1	33kΩ	E2
R2	47Ω	E2
R3	12kΩ	E1
R4	430Ω	E2
R5	12kΩ	E2
R6	2·4kΩ	E1
R7	820Ω	E2
R8	2·7kΩ	E1
R9	2·7kΩ	E1
R10	390Ω	E1
R11	12kΩ	E2
R12	68kΩ	E1
R13	47kΩ	E1
R14	3·9kΩ	E1
R15	27Ω	D1
R16	4·7kΩ	E2
R17	820Ω	D1
R19	47kΩ	D2
R20	2·4kΩ	D2
R21	820Ω	D1
R22	150Ω	E2
R23	430Ω	D1
R24	330Ω	D1
R25	47Ω	D2

Capacitors

C1	5µF	E2
C2	50µF	E2
C3	4700pF	E2
C5	0·01µF	E1
C6	30µF	E1
C7	0·1µF	E2
C8	0·05µF	E2
C9	0·5µF	E2
C10	5µF	E1
C11	50µF	D2
C12	5µF	D2
C13	5µF	D2
C14	50µF	D2
C15	220pF	E2
C16	500µF	D1
C17	500µF	D2

Transistors

Tr1	AC126	E1
Tr2	AC126	E2
Tr3	AC126	E1
Tr4	AC126	E2
Tr5	AC126	D1
Tr6	AC127	D2
Tr7	AD136	D1
Tr8	AD136	D2

(types quoted are nearest UK equivalents)

FM TUNER

Resistors

R1	1kΩ	F2
R2	2·7kΩ	F2
R3	6·8kΩ	F2
R4	1·8kΩ	G1
R5	4·7kΩ	G1
R6	4·7kΩ	G1
R7	1kΩ	G1
R8	2·4kΩ	F1

Capacitors

C1	22pF	G1
C2	4700pF	G1
C3	43pF	G2
C4	Tuning	G2
C5	4700pF*	G1
C6	4-15pF*	F2
C7	3·9µF	F1
C8	0·033µF	G1
C9	1500pF	F2
C10	4700pF	G1
C12	150pF	G1
C13	5·1pF	G1
C15	150pF	G2
C16	36pF	G2
C17	Tuning	G2
C18	39pF	F1
C19	3300pF	F1
C20	4700pF	G2

Transistors

Tr1	AF114	F2
Tr2	AF114	G1

COMPONENTS IN WIRING

Resistors

R1	10kΩ*	volume
R2	10kΩ*	treble
R4	10kΩ*	bass

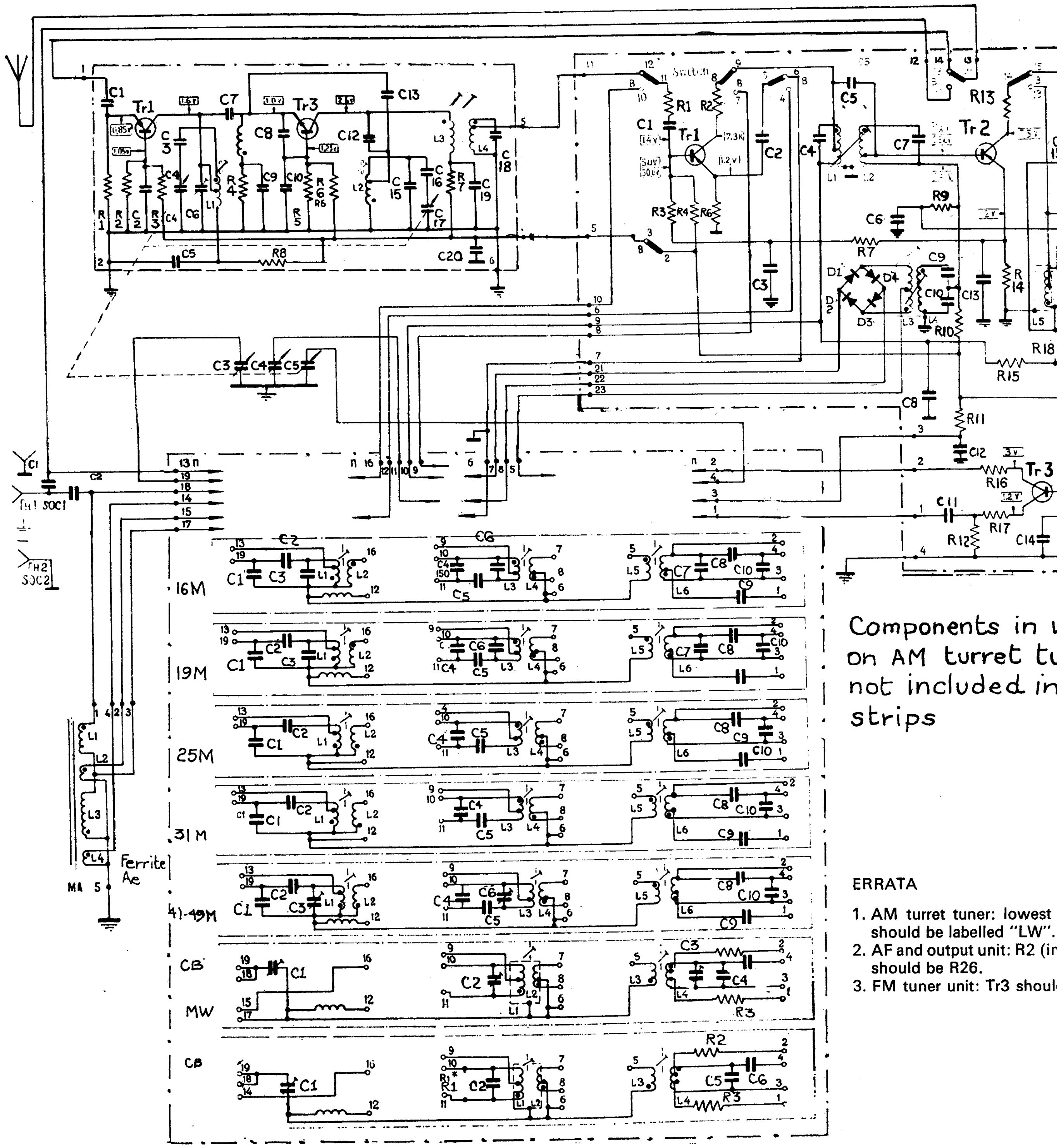
Capacitors

C1	15pF
C2	10pF
C3 to C5	Tuning
C6	10µF

(Turret tuner components overleaf)

F.M. Tuner

C		C	8 9 13 17,1
	1,2,3,4,5,6,7,8,9,10 12,13,15,16,17,20,19,18		1 2 3 4 5 7 11,10,12 14,16,
R	1,2,3. 4,8, 5,6 7	R	1,3,4,6,2 7 9,11,16,13,17
			10,12,14,15,18



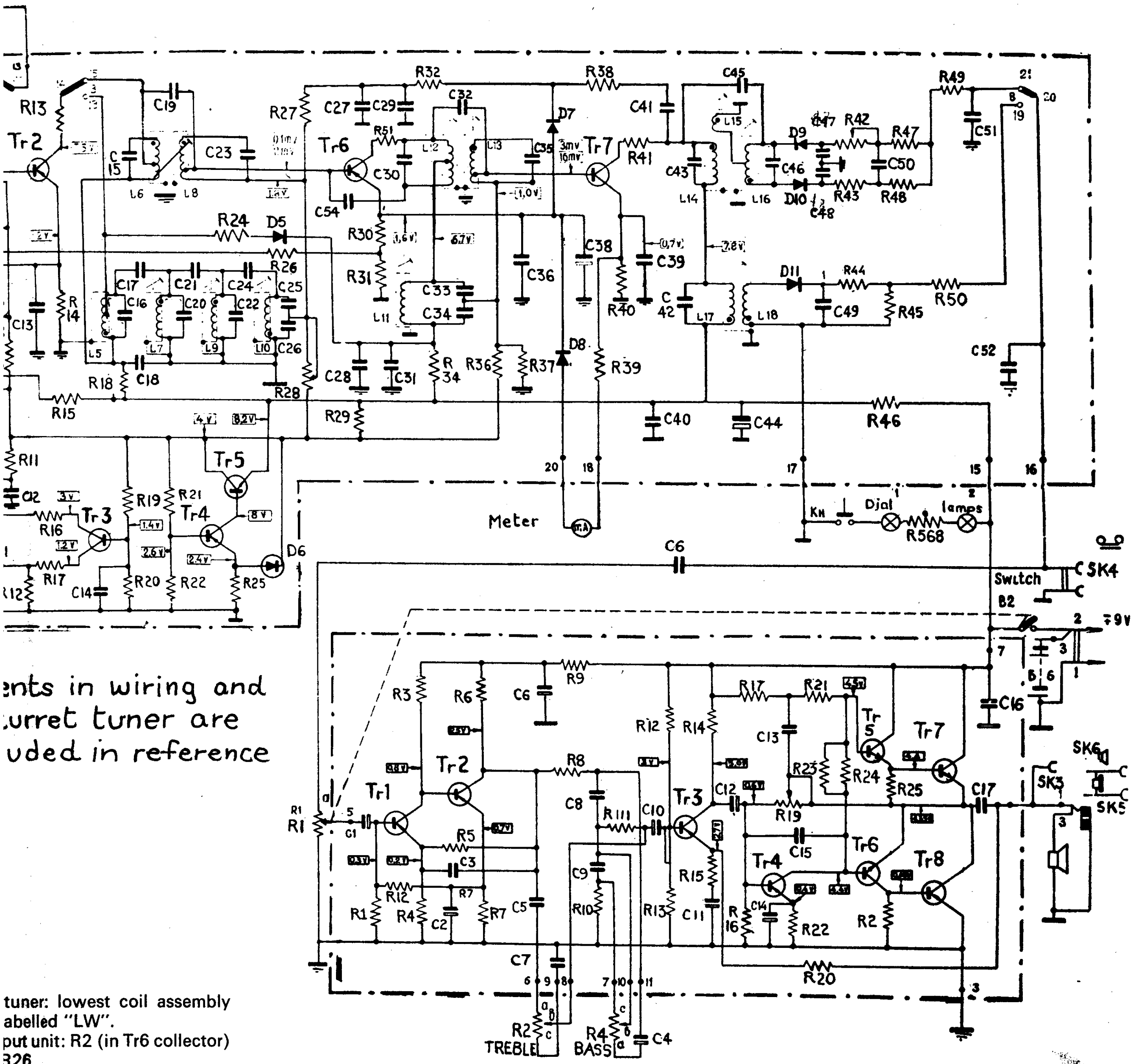
Components in
on AM turret tu
not included in
strips

ERRATA

1. AM turret tuner: lowest
   should be labelled "LW".
2. AF and output unit: R2 (in
   should be R26.
3. FM tuner unit: Tr3 shoul

I. F

3 17,15,19,21,24,22,28,27,29,33,34,35	40,41, 45, 46,47	
2 14,16,18,20,23,25,26,54, 31,30,32,36	38 39,42,43,44 49,48,50,	51,52
1,16,13,17 19,21 24 27 30 31 51 32	38,39,41	42,43,47,50,49
2,14,15,18 20,22,25,26,28,29,34,36,37	40	44,45,46,48,568.



...nts in wiring and
...urret tuner are
...uded in reference

AF and output

tuner: lowest coil assembly
abelled "LW".
put unit: R2 (in Tr6 collector)
R26.
nit: Tr3 should be Tr2.

C	1 2 3 5,7,6,8,9,4,10,11,12,14,13,15 17,16
R	12,3,6, 8,9,111,12, 14 ,17,23,21,24,25
	1,4,5,7, 2,10,4,13, 15, 16,19,22,20,2.

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